

**WHAT IS CLAIMED IS:**

1. A permanent magnet alternator comprising:  
a stator including a stator body and a plurality of spaced stator poles projecting inwardly from said stator body;  
a winding circuit wound through the spaces between said plurality of stator poles,  
a rotor assembly mounted for rotation within said stator body, said rotor assembly including a rotor body;  
a plurality of permanent magnets fixedly mounted on an outer circumferential surface of said rotor body in alternating polarity; and  
retaining means for reducing the effects of centrifugal motion of said rotor body during operation of said alternator, said retaining means being positioned between said plurality of permanent magnets and said stator poles.
2. The permanent magnet alternator as defined by claim 1, wherein said retaining means comprises a cylindrical sleeve.
3. The permanent magnet alternator as defined by claim 2, wherein said cylindrical sleeve comprises a non-ferromagnetic material.
4. The permanent magnet alternator as defined by claim 3, wherein said non-ferromagnetic material is stainless steel.
5. The permanent magnet alternator as defined by claim 1, wherein said rotor body comprises a non-ferromagnetic material and said outer circumferential surface of said rotor body comprises a ferromagnetic material.

6. The permanent magnet alternator as defined by claim 5, wherein said non-ferromagnetic material is aluminum and said ferromagnetic material is steel.

7. The permanent magnet alternator as defined by claim 1, wherein said winding circuit is a multiphase winding circuit.

8. The permanent magnet alternator as defined by claim 7, wherein said multiphase winding circuit is a three phase winding circuit.

9. The permanent magnet alternator as defined by claim 1, wherein said rotor assembly includes a first rotor body and a second rotor body.

10. A permanent magnet alternator comprising:  
a stator assembly including a stator body and a plurality of spaced stator poles projecting inwardly from said stator body;  
a winding circuit wound through the spaces between said plurality of stator poles;  
a rotor assembly mounted for rotation within said stator body, said rotor assembly including a rotor body and a plurality of fan-like projections spaced equidistant along said rotor body;  
a plurality of permanent magnets fixedly mounted on an outer circumferential surface of said rotor body in alternating polarity; and  
retaining means for reducing the effects of centrifugal motion of the rotor body during operation of said alternator, said retaining means being positioned between said plurality of permanent magnets and said stator poles,  
wherein each of said fan-like projections project outwardly from said rotor body along a plane lying substantially parallel relative to an outer surface of said rotor body so as to reduce the ambient temperature within said alternator during rotation of said rotor body.

11. A permanent magnet alternator comprising:

a stator including a stator body and a plurality of spaced stator poles fixedly mounted on said stator body, each of said plurality of stator poles projecting outwardly along a plane lying substantially parallel relative to an outer circumferential surface of said stator body;

a winding circuit wound through the spaces of said plurality of stator poles;

a rotor including a rotor body mounted in opposition to said stator body; and

a plurality of permanent magnets fixedly mounted on said rotor body in alternating polarity, each of said plurality of permanent magnets projecting outwardly along a plane lying substantially parallel relative to an outer circumferential surface of said rotor body,

wherein said rotor body is operatively positioned relative to said stator body such that said plurality of permanent magnets are rotateably aligned with said plurality of stator poles so as to generate a continuous alternating flux density magnetic field along a primary flux path.

12. A regulator for applying the output of a permanent magnet alternator having at least one stator mounted coil to a load, said regulator comprising:

a rectifier circuit having an output and an input adapted to be connected to a stator mounted coil for converting alternating potential into a time varying potential on said output;

a current control circuit connected between said output of said rectifier circuit and the load and for cycling between (1) a conductive state to conductively connect said rectifier circuit with the load and (2) a non-conductive state to isolate said rectifier circuit from the load;

an instantaneous voltage sensing circuit connected with said output of said rectifier circuit and said current control circuit for measuring the instantaneous voltage appearing on said output and for causing said current control circuit to assume its

conductive state when said instantaneous voltage is above a predetermined amount;  
and

a regulator control circuit for (1) sensing the voltage applied to the load by said current control circuit and for causing said current control circuit to assume its non conductive state when the voltage applied to the load is above a desired level and (2) for shortening the time during which said current control circuit is in its conductive state as the voltage applied to said load approaches the predetermined level.

13. A regulator as defined in claim 12, wherein said regulator control circuit includes a sensing circuit for determining if a short circuit exists by measuring the period of time said current control circuit is in a conductive state.

14. A regulator as defined in claim 12, wherein said regulator control circuit includes an input connected with an RC circuit for adjusting the operating voltage of said regulator circuit in response to changes in the duty cycle of said current control circuit.

15. A regulator as defined in claim 12, further including an alternator failure indicator responsive to an over voltage or under voltage condition to produce an alternator failure condition.

16. A regulator as defined in claim 12, further including a load dump circuit selectively connectable in parallel with said load, said load dump circuit being connected in parallel when the voltage applied to the load continues to increase for more than a predetermined period.